FINAL REPORT

Fall Mission: October 26, 2010 – December 21, 2010

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"Conservation and Documentation of the Wall Paintings at the Red Monastery, Sohag"

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INTRODUCTION

This report covers work performed under the sub-grant, "Conservation and Documentation at the Red Monastery, Sohag", an activity of the Egyptian Antiquities Conservation Project (EAC) funded by the United States Agency for International Development (USAID). The American Reserch Center in Egypt (ARCE) was awarded the EAC project agreement in July 2004. The following report describes work performed from October 26th to December 21st 2010.
The conservation campaign conducted in the Monastery of St Bishoi (Red Monastery) at Sohag[1] during the fall of 2010 involved the following parts of the building: the east lobe of the triconch, the baptismal font in the diaconicon (SEC), three of the monumental columns, the north wall in the facade (F) and concluding work in the north corridor (NEB).

Work was carried out on the first tier of the east lobe, but did not address the interiors of the three niches; in the third tier, work inside the apse was completed.

Figure 1

At ground level (first tier) restoration of all the columns and painted flat panels was completed.
In the diaconicon (SEC), work was completed on the niche containing the baptismal font. A water drainage system was installed and the masonry beneath it infilled.

[1] The team comprised Luigi De Cesaris, Alberto Sucato, Emiliano Abrusca, Emiliano Albanese, Chiara Arrighi, Luigi De Prezzo, Chiara Di Marco, Alessandra Meschini, Valentina Periproto, Diego Pistone, Riccardo Remigio, Emiliano Ricchi and Maria Cristina Tomassetti.

In the north corridor (NEB) pointing work to repair the patchy plaster inside and along the jambs of the three niches was completed and the broken line technique was used to reintegrate a gap in the plaster on the face of the *Virgo Lactans* on the west wall. In the facade area (F), all the white plaster was cleaned and restoration of the painted cross on the north wall was completed.
Both the columns and capitals on the north side of the facade area have been completed and only one portion of the larger monumental column on the south side remains to be restored.
All areas of restoration work were comprehensively photographed throughout the campaign.

WORKING METHODS

Architecture

East lobe
The triconch is built of blocks of limestone from local quarries, infilled with fired bricks (Figure 2).
The apse is built of fired bricks measuring approximately 19 x 9 x 11 cm, mostly arranged lengthways. The moldings and semi-capitals are made of limestone.

Figure 2

The architecture of the east lobe does not differ substantially from that of the north and south lobes although there are only three niches (second tier) rather than the four present in the other two lobes.

Columns of the Facade

There are four monumental columns, and a further two supporting the triumphal arch. The columns were probably pillaged from ancient Egyptian or Roman monuments and the shaft of each is cut from a single piece of red Aswan granite.
The late antique capitals are made of local, soft, white, chalky limestone (Figure 3). Fossilized organisms can be seen in the stone with the naked eye. The limestone capital of the highest column on the south side has been restored.

Figure 3

Plaster

East lobe

There is a complex palimpsest of plaster types in the east apse. We assume that the bricks are based on mud and straw and finished with a red hematite color (first phase), as in the north and south apses. The second-phase plaster, to date only identified with certainty in the domes, is visible on approximately two thirds of the surface of the semi-dome. This lime- and sand-based plaster can be distinguished by the presence of a great deal of powdered limestone that makes it a bright white color. The mortar also contains a considerable percentage of powdered brick and straw. The plaster was applied in several consecutive layers (Figure 4) and the final layer, containing a good deal of lime and not much limestone, is distinguished by its particularly smooth finish (Figure 5) (see report by Artelab srl – Studio dei materiali costitutivi e delle tecniche impiegate per la realizzazione delle varie fasi pittoriche [*study of the component materials and techniques used in the various phases of painting*], page 9, Rome, 2004).


Figure 4

Figure 5

The third-phase plaster is approximately 0.5 to 0.7 cm thick and has only survived in the lower part of the semi-dome, to a height of approximately 50-70 cm from the cornice and in the area beneath the arch. Its composition closely resembles that of third-phase plaster found in other parts of the church. Inside the semi-dome, the second- and third-phase plaster is covered by whitewash applied to prime the surface for the painting of the fourth phase (Figure 6).

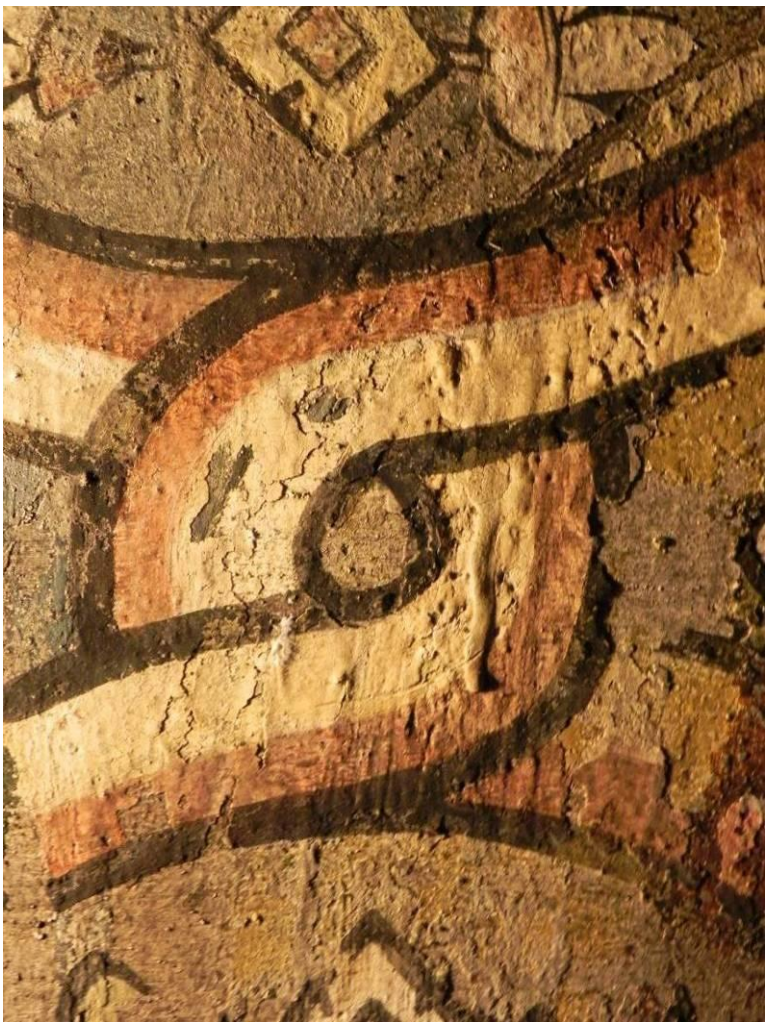


Figure 6

As we will describe below, both the third-phase plaster and the whitewash with the fourth-phase paint layer fell or were removed from a large central area. This was the state of affairs when the individual we now call the "fourth-phase plus" painter primed the surface of the semi-dome. Having the same materials at his disposal, he used an only slightly thinner whitewash. Before applying the whitewash, the painter carried out a limited amount of pointing along the edges of the gaps in the plaster in order to even out the irregularities in the palimpsest (Figure 7).

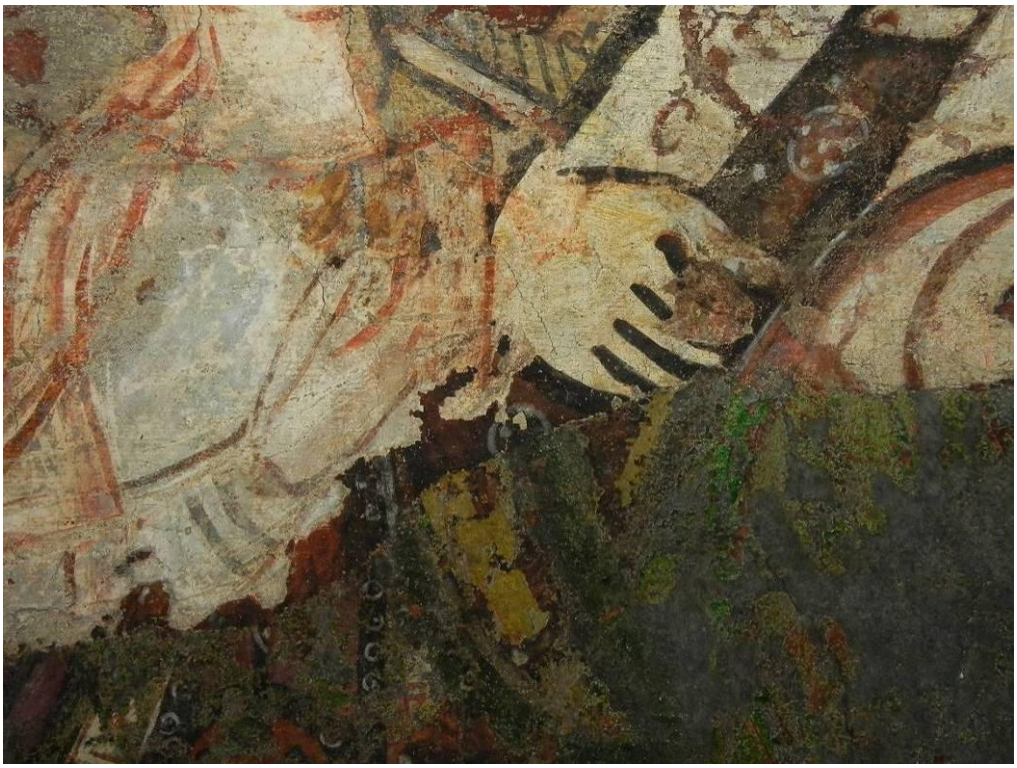


Figure 7

We are inclined to link this phase with the previous one since we believe that not much time elapsed between the two (cf. paint layer: working method).

Ground floor

The plaster palimpsest in this area comprises two layers: the first is better preserved with third-phase paintings of *velaria*; overlying this in the area below the central niche alone, there are fragments of a painting of three haloed figures on whitewash that presumably dates from the fourth phase.
The third-phase plaster has the same features as that in other parts of the church. The plaster was applied in a layer varying from approximately 0.5 to 1 cm in thickness (the thickness diminishes on the moldings and column shafts), is lime-based and contains large, smooth, round grains of quartz sand[2] (Figure 8). It has a very smooth, almost burnished surface. As we have observed for some time, the surface of this plaster appears smooth and less granular than the third-phase plaster of the higher tiers and, under close examination, the mortar proves to contain finer and more irregular sand[3].

[2] \See Artelab s.r.l., Studio dei materiali costitutivi e delle tecniche impiegate per la realizzazione delle varie fasi pittoriche [*Study of constituent materials and techniques used to execute the various phases of painting*] (September 2005).

[3] During the third-phase work the decision was made to plaster the lower areas with a denser stronger mortar with an extremely smooth surface in view of the fact that these areas were more exposed to

Figure 8

The third-phase plaster is overlaid by what is probably fourth-phase whitewash, intentionally limited to the area below the central niche between the two columns (Figure 9).

Figure 9

potential damage during religious services. This decision also produced a more refined esthetic finish for those paintings that were closer to members of the congregation.

Facade

On the north side of the facade area, the medieval plaster is approximately 8-10 mm thick. It comprises a white lime-based mortar with a low percentage of sand and a considerable amount of straw in the mix (Figure 10). It has been given a slightly irregular surface finish.

Figure 10

A few fragments of whitewash, presumably dating from the late antique, are visible on the shafts of the monumental columns in this area. Sizeable portions of a pinkish plaster can also be seen on the column bases (Figure 11). The limestone column bases were originally coated with this red plaster to make them tone in with the granite columns above them.

Figure 11

Paint layer

East lobe, apse

-Second Phase

Figure 12

The cleaning of the east dome has enabled a new reading of the red preparatory drawing that contains some complex second-phase iconography. The few surviving fragments of the paint layer and the two areas of detached plaster described below have enabled us to observe that the artist adhered to the preparatory drawing with precision in his final painting. Traces of a blue pigment (almost certainly Egyptian blue) suggest that the scene originally had a light blue background. The cycle represents a beardless Christ enthroned in heaven (Figure 12) and supported by two archangels. The twelve apostles amongst flowering trees and, in the center, another two archangels at the feet of Christ are depicted in the lower band (Figure 13).

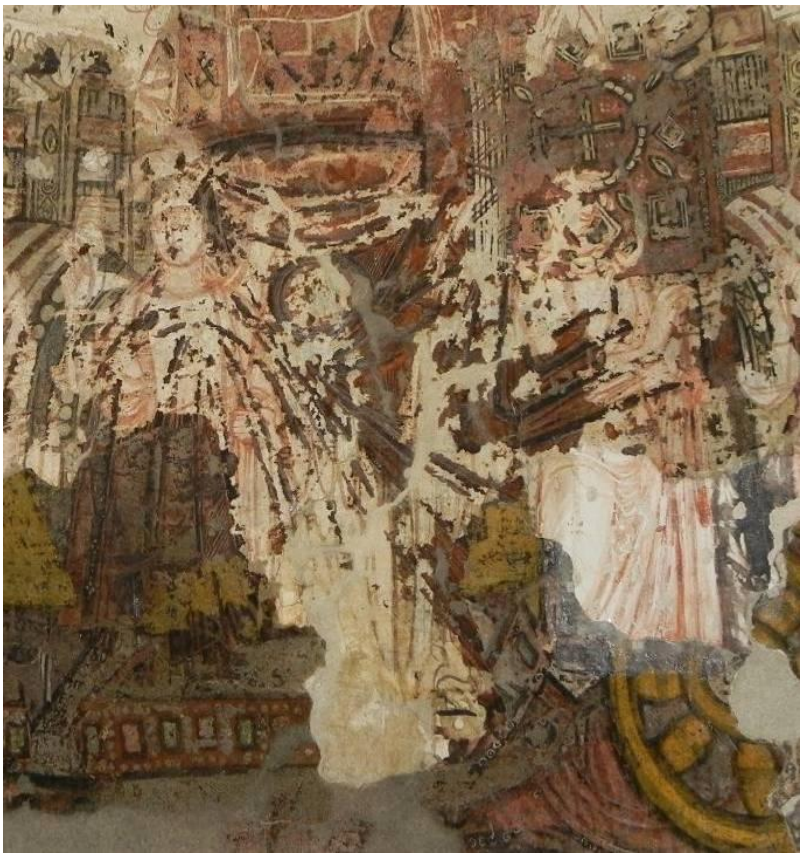


Figure 13

Both the drawing and the painting appear to have been executed extremely rapidly. The style and naturalistic features of the portraits seem to suggest a classical heritage.
It can be seen from the faces and hands of the twelve apostles (Figures 15 and 16) that an initial small sketch forming part of the preparatory drawing was succeeded by a larger and more detailed final version[4]. This leads us to think that the preparatory drawing was done primarily in order to divide up the space, then refined to adjust the proportions and add detail to the faces, draperies and other figurative elements.

[4] In the large gaps in the plaster above the heads of the apostles it is also possible to make out a horizontal strip comprising two lines that divides the composition into two tiers. The names of the apostles are inscribed within this strip (Figure 17).

The removal of two detached fragments from the third phase (Figures 14, 58 and 59) has enabled us to study certain features of the paint layer. Once the preparatory drawing was completed, the artist painted in the flesh tones with a light pink obtained by mixing white and a little red earth. At the same time, the draperies were painted with red and yellow earth pigments. Next, the design was traced over with a thinner dark red line and the haloes were painted in the same color. Subsequently Egyptian blue mixed with white was used for the tunics and the sky. The darker details of the robes, hair, some facial features and decorative touches such as the small crosses were then added. The blossoms and fruit on the trees were added in a heavier dark pigment before the application of the green encaustic pigment, now lost (Figure 17). The blossoms between the apostles stand out clearly against a black background that also throws the figures of the twelve saints into strong relief. Finally, touches of white were applied as highlights and finishing.

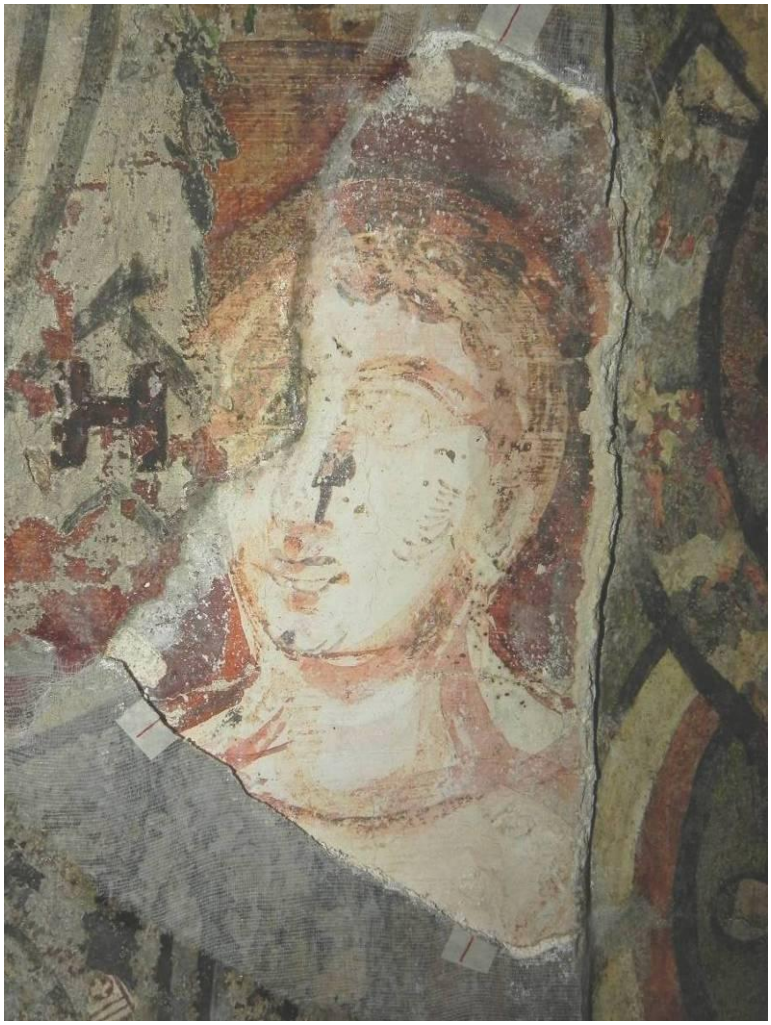


Figure 14


Figures 15 and 16

Figure 17

-Third Phase

The painted plaster of the third phase overlies the paintings described above.
As we have observed several times, the period during which the wall paintings in the church were renewed was marked by a significant iconographical shift. In the apse, the bipartite representation is transformed into a scene depicting a huge Christ Pantocrator enthroned within the mandorla which extends from the top to the bottom of the semi-dome. We are inclined to think that in this phase the mandorla was supported by the four living creatures from the Book of Revelation of which all that remain are imprints of yellow and the four wheels of the chariot. The wheels are made up of two yellow rings with rays

painted between them and at the center there are two small faces. To the right and left of the chariot, there are red flames heavily outlined in black that stand out against a green background painted using the encaustic technique (Figure 18).

Figure 18

Frontal depictions of the two archangels Gabriel and Michael rising up at the sides of the mandorla are only partially visible beneath the later painting. The two haloes, the profile of the hair and the right foot of the left-hand archangel can easily be made out through the gaps (Figures 19 and 20). The sky forming the background to the profile of the haloes and wings, bordered by two elegant encaustic green lines, is an intense blue, presumably Egyptian blue.


Figures 19 and 20

The two archangels are wearing a purple-red cloak and a robe whose hem is richly bordered with red and green gemstones.

Figure 21

Fourth and Fourth Plus Phases

As comprehensively described in the paragraph on plaster types, the painter of the *Virgo Lactans* covered the third-phase plaster with whitewash, but closely followed the preceding iconography. The fragments of the image of Christ Pantocrator lead us to think that the dimensions of the third-phase Christ must have been very similar.

Figure 22

The wheels of the chariot are of different sizes. They are set well apart and the front wheels are turned towards the central axle (Figure 23). The four living creatures are also depicted but all that remains of them are the characteristic pairs of wings covered with eyes (Figure 22).

Figure 23

The cornice in the area beneath the arch reworks the motifs from the painted band (third-phase) with a pattern of circles and twining plants that extends beneath the windows in the clerestory. The presence of this cornice slightly reduces the space for composition and in this phase, the archangels Michael and Gabriel were made smaller.

The cleaning operations have enabled us to reexamine the colors and techniques of the paint layer and to identify a phase later than that of the *Virgo Lactans*[5].

Although we linked the bust of the archangel Michael to the fourth phase in the report for the previous mission we are now inclined to think that it belongs to a later phase of the late antique. The technical similarities that led us to ascribe it to the fourth phase during the previous mission now incline us to consider it late antique and painted not too long after the time of the painter of the *Virgo Lactans*.

Essentially, it seems that although the painter of the fourth phase closely reproduced some aspects of the iconography of the previous phase, in this new stage (that we have called 'fourth phase plus') the painter eliminates the four living creatures and replaces them with four angels supporting the mandorla.

The features in support of this modification theory[6] include the piece of white drapery decorated with crosses inscribed within small circles that is painted over the wings of the four creatures, the two hands and part of the arm holding the starry border of the mandorla and the stylized representation of the sun (Figure 24).

[5] See the report for Autumn 2003 for a description of the working methods of the fourth phase.
[6] See the report for Spring 2010 for an analytical description of the working method of the fourth phase plus.

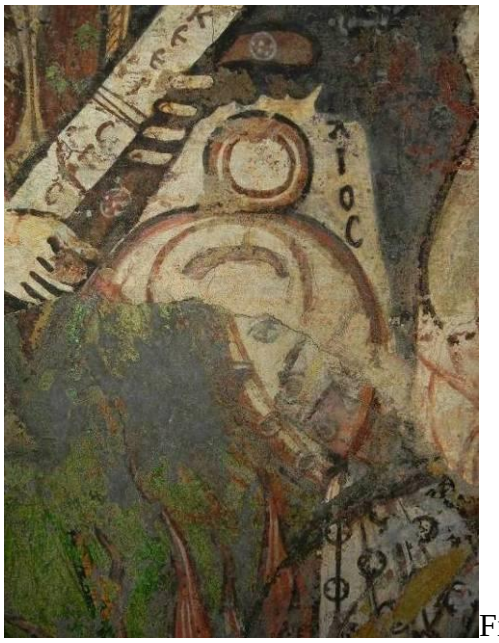


Figure 24

After cleaning the two archangels also revealed the presence of these two phases.
There is actually a profound difference in terms of style and composition between the upper part, painted on the second-phase plaster, and the lower part, painted over the later third-phase plaster (Figure 25). The upper part of the body, depicted wearing a simplified tunic, is stretching out towards the mandorla, offering the scrolls to Christ; the lower part, distinguished by richly variegated draperies that are consistent with the artistic style of the fourth phase, is presented in a frontal position. On the lower part of the left-hand archangel we have identified some reworkings, overlaid in yellow and red on a thin layer of whitewash in a manner consistent with the painting of the simplified tunic of the archangel Michael in the fourth phase plus (Figure 26).
The saint[7] (Figure 28) painted on the left of the area beneath the arch, overlying the fourth-phase band with circle and plant motifs, appears to belong to this same phase.

[7] We are in the process of obtaining a translation of the Coptic inscriptions flanking the figure of the saint. This could clarify his identity.

Figure 25

Figure 26

Figure 27

We can therefore advance the theory that the painter of the *Virgo Lactans* painted his own version of the Pantocrator directly on the third-phase plaster still in situ and that after the loss or removal of the large area of third-phase plaster, he applied a new coat of whitewash. At this stage, the painter produced a new version of the benedictory Christ in the mandorla and substantially modified the iconography of the vault by transforming the four living creatures into four angels holding up the mandorla (Figure 27).
To summarize, we are inclined to think that at this point the painter of the fourth phase started repainting the east semi-dome without major iconographical changes, inscribing his work within a cornice decorated with circle and plant motifs inspired by older examples. After this first operation, the painter of the *Virgo Lactans* extended his work to all parts of the church. It included a reworking of the subjects in the north and south domes and a geometric, decorative and monochrome transformation of the triumphal arches and the clerestory. Only after a period of time had elapsed was the painting in the east dome reworked either as the result of a desire to alter the iconography of the subject or because plaster had fallen off the dome.

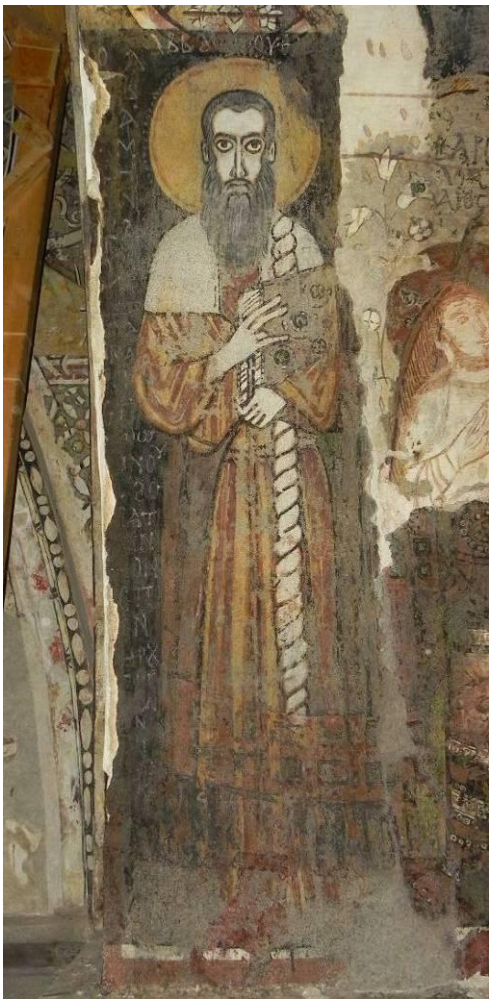


Figure 28

East lobe, first tier

In the first tier, the third-phase *velaria* extends in a horizontal band below the three niches. The cleaning work has brought to light an area of elegant painting that is still worthy of admiration, despite its patchy state (Figure 29).

Figure 29

The palette is consistent with what we have already described in connection with the third phase: red, black, green and white tempera colors are used for all elements of the design and background; green and pink encaustic pigments are used for the floral designs painted in the center of each *velarium*.

The fourth phase painter applied his trademark whitewash to this surface, in the central area between the two granite columns. Three haloed beardless figures at prayer are depicted here (Figure 30), although they are extremely patchy. One sketched-in detail seems to depict a number of flames, possibly intended to suggest a fire below. Although poorly preserved, originally the scene must have been finely painted and the backgrounds still bear a few significant fragments of encaustic green.

During the restoration work, we observed a few drops of green wax on the whitewash on the shaft of the north-east granite column. These presumably fell onto the surface while the lateral flat panels of the third phase were being painted.

Figure 30

Facade, north wall

On the left side of the north wall, adjacent to the wall built by the Comité, there is a painted cross that can be ascribed to the medieval phase of the nave. The iconography and working methods show a striking resemblance to the cross recovered on the left side of the facade in spring 2008.

What is visible today is the right-hand part of a large painting comprising a cross sheltered beneath the tympanum of a ciborium decorated with braids, circular motifs, crosses and an elegant edging of geometric shapes and flowers (Figure 31). Beneath the architrave is a richly decorated curtain suspended from a pole by a number of loops. The curtain has a double border and a pattern of small roundels and is looped around the column. Two birds of different sizes are perched on the pediment, facing inward towards a semi-circular element with an exedra.

Figure 31

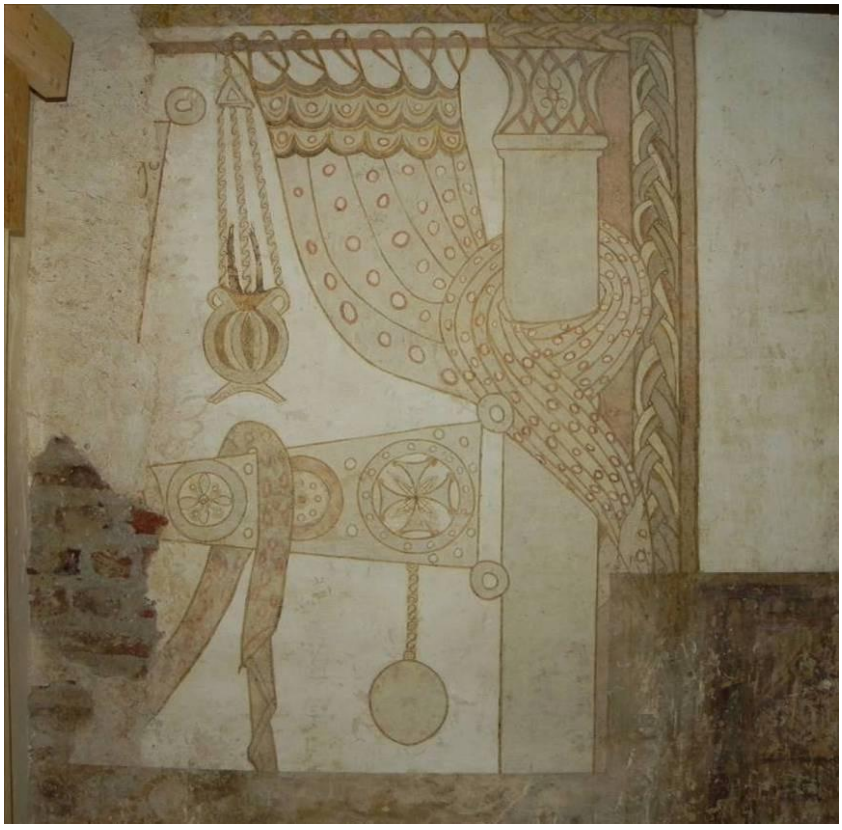


Figure 32

Liturgical objects are depicted within the structure: a thurible is suspended from the curtain pole and an ostrich egg hangs from the right arm of the cross over which is draped the veil, the symbol of Christ's passion (Figure 32). The arm of the cross terminates in two rings and contains three circular motifs inscribed with crosses and patterns.

The design is executed in yellow ocher applied with a brush. The artist uses a limited palette to produce graphic and pictorial effects of great quality and elegance reminiscent of the cross recovered in 2008. The encaustic technique is used, but as a result of long exposure to atmospheric agents it has now completely disappeared apart from the imprints remaining where the plaster has fallen away.

Close observation under a raking light reveals the holes made by the compass the painter used to draw the numerous circles in the painting (Figure 33). A builder's cord was used to draw the right-angled shapes.

Figure 33

Finally, the discovery of two tiny drawings of elephants should be noted (Figure 34). These were drawn directly onto the plaster further to the right on the same wall.

Figure 34

STATE OF PRESERVATION AND PREVIOUS CONSERVATION WORK

Masonry and plaster

In antiquity the east lobe was affected by structural instability that caused cracks and falls of plaster including the loss of a large portion of plaster from the center of the apse. The causes of this instability and the subsequent settling of the masonry were considered in the report for the spring mission of 2007[8]. Damage linked with these events can clearly be seen in the masonry, plaster and paintings of the east lobe worked on during this mission.

Other equally obvious and grave effects of these structural problems include the presence of slightly misaligned planes and a series of cracks running vertically in the semi-dome. The misalignment of planes can be seen along the line dividing the area beneath the arch from the apse and impacts severely on the masonry and plaster. The problem is exacerbated because the masonry changes from blocks of limestone to red bricks at this point.

Most of the falls of plaster can be seen to have occurred along the line of these cracks (Figure 35).

Figure 35

[8] : L. De Cesaris and A. Sucato, Red Monastery – Monastery of St. Bishoi, Conservation of the wall paintings – Final Report, Spring 2007

The second-phase plaster is covered in pick marks made before the third-phase plaster was applied to encourage optimum adhesion of the new plaster. The traces of the third-phase plaster can still be seen inside the pick holes.
The third-phase plaster is extremely patchy. There is a broad band remaining in the area beneath the arch and lower down extending to approximately 50-70cm from the line of the cornice. Whitewash associated with the phase of the *Virgo Lactans* was applied over the third-phase plaster and can still be seen on the surviving portions. At a later stage, probably as a result of extensive falls of plaster, a new and final coat of whitewash was applied, but not to most of the area beneath the arch. This is known as fourth phase plus. This layer is particularly patchy, presumably as a result of efforts during earlier restoration work to reveal the underlying paint layers. The scratches made during the mechanical removal of the whitewash described above can still be seen on the second-phase plaster.

The left side of the vault is better preserved, so that the angel holding up the mandorla and the archangel Michael holding out the scroll can be seen quite clearly. The surviving fragments of this latter phase still show various details of the Pantocrator in the mandorla and allow us to intuit the composition of the scene.

In the lower strip where the third-phase plaster is present, extensive areas of the original surface are covered by pointing with cement-based mortar (see Figure 35).

East lobe – first tier

One of the major causes of the particularly accentuated damage in this area is its intensive use for religious ceremonies.

The floors of the niches are used as shelves and have been exposed over the centuries to an accretion of burnt material from candles and oil lamps that has caused severe damage to the stonework in the central and right-hand niches. In the central niche the floor has been covered with a slab of white marble approximately 3 cm thick owing to the degree of damage and parts of the plinth of the small south column are missing. In the right-hand niche, the original slab is missing and a new floor has been created at a lower level using a cement-based mortar. Approximately two thirds of the bracket has also been lost. In the north niche opposite, the limestone floor has been repaired with a cement-based mortar. There are gaps in the plaster (Figure 36) in the lower area between the columns where the large *velarium* is painted. A deep crack running vertically through the entire lobe terminates on the right of the south-east column. The crack has caused the plaster to fall off or become raised in places, some of which have been repaired with cement-based mortar that encroaches extensively on the original surfaces.


Figure 36

Paint Layer

The state of preservation of the paint layer varies enormously as a result of numerous factors:

- The technical and constituent properties of the materials used and the stratification of the palimpsest.
- Water entering through cracks, windows and the roof. This has caused signs of washing away, saline efflorescence and blackening on the painted surface.
- Atmospheric agents and solar radiation, particularly on the upper part of the church and the facade area.
- Bird droppings and the establishment of colonies of insects on the painted surface in cavities in the masonry and sockets for woodwork.
- Human depredations caused by: attempts to clean the surface; attempts to remove mortar used for repairs; the removal of more recent paint layers in search of older ones and inscriptions, the religious ceremonies that result in the excessive deposition of sooty particulate matter and wax; cleaning and maintenance work.

<u>East apse</u>

The paintings in the semi-dome have been subjected to conservation work, most recently at an unspecified point subsequent to the work of the Comité during the second half of the twentieth century. As in the other two apses, a thick layer of oil- and resin-based varnish was applied to the surface of the east apse. This varnish is now heavily oxidized[9]. Furthermore, as already described for the south semi-dome in particular, drastic cleaning

[9] It is interesting to note that the oil and resin deposits are particularly prevalent in the areas where the fourth-phase plus whitewash is extant.

operations that even employed mechanical methods to reveal the paintings and inscriptions have caused serious abrasion of the entire surface[10].

It is important to remember that the east lobe was the most important focus of religious activity and that the bases of the niches were used to hold candles, oil lamps and other combustible objects. This practice means that the apse contains enormous quantities of sooty residue.

The extensive network of tiny cracks affecting the surface of the fourth-phase plus whitewash may be partially explained by prolonged exposure to the products of combustion listed above (Figure [*number not supplied – Trs.*).

Today, phase two is primarily visible in the preparatory drawing. This state of affairs can be attributed principally to the fact that the detachment and loss of the third-phase plaster tore off and destroyed the painted finish of the second[11].


Figure 37

Although the fourth phase plus is extremely patchy, it is still preserved in the lateral areas and we can admire the features of the working method from the upper part of the archangel Michael and the front-facing figure of the saint depicted in the area beneath the arch.
The lower part of the saint is particularly badly affected by detached plaster and micro-gaps that reveal the gem-studded decoration of the robe of the archangel beneath (see Figure 28).

[10] The central part of the apse is the area that suffered most severely from the effects of previous attempts at cleaning. The entire area with second-phase paintings has suffered a serious loss of surface painted finish.
[11] However, this detachment can also be associated with a fragility intrinsic to the second-phase paint layer.

First Tier

The painting appears to be almost entirely covered by a thick layer of sooty particulate matter resulting from the intensive religious activity in this area (Figures 38 and 39).
There are numerous drips of candle wax under the brackets of the niches and many of the original details are covered by traces of pointing used in repairs. Furthermore, damage to the paint layer has increased as a result of human activity owing to the repeated and more intensive use of the area, particularly since the altar was moved to the inside of the lobe.


Figures 38 and 39

The details painted using the encaustic technique have been partially lost. When they fell, these details left imprints that can be distinguished by their lighter color from the general level of dirt. These imprints are extremely important to us as they testify directly to the working method and, in particular situations where the damage is serious, become essential elements for the preservation of painted motifs that would otherwise be lost (Figure 40).


Figure 40

Facade – north wall

The composition of the painted cross enables us to read a good many of the iconographic details. The painting was exposed to atmospheric agents for a long time and its finish has been extensively abraded and thinned by exposure to the wind that often carries desert sand. Exposure to the rays of the sun has caused the loss of those details painted using the encaustic technique. High temperatures have also caused an unusual type of damage: the details painted with wax contracted before they fell off, tearing the finish of the plaster and leaving imprints slightly below the rest of the surface (Figure 41).


Figure 41

Near the west wall there are localized abrasions and lost areas of paint layer associated with the construction of the wall by the Comité.

RESTORATION WORK CARRIED OUT

As in previous years, we have carried out our restoration work in accordance with the methodological guidelines first laid down in 2003. We have continued to refine and update our working methods and the materials used in response to new problems that have arisen in the intervening years until the present mission.

The first task was to remove dust from the surfaces using soft bristle and sable brushes. Where portions of plaster, fragments and elements of the paint layer (palimpsest) were in immediate danger of falling, they were secured by means of small strips of Japanese paper stuck to the surface using a 15% solution of acrylic resin (PARALOID B72) in acetone. This operation was necessary on the third-phase plaster inside the east apse, particularly along the edge of the large central gap and along the inner edge of the area beneath the arch. Some fragments of the fourth phase plus still present on the second-phase plaster required protection with strips of Japanese paper.

In places where the plaster had been repaired during earlier restoration work using inappropriate mortar, this was removed mechanically using micro-chisels and scalpels.

In places where the composition of the pointing was compatible with the original plaster, it was brought to the level of the original paint layer by mechanical means, uncovering each hidden fragment of plaster and paint layer.

The gaps in the plaster were repaired with mortar similar in appearance and composition to the original plaster types (Figure 42). Hydrated lime, local sand and a small percentage of crushed local limestone were used (1.5 parts lime, 2 parts sand, 1 part crushed limestone). The mortar was always formulated to have a lower mechanical resistance than the original plaster. Repairs and pointing were carried out whilst respecting all levels of the palimpsest, taking care not to cover any phase of painting.


Figure 42

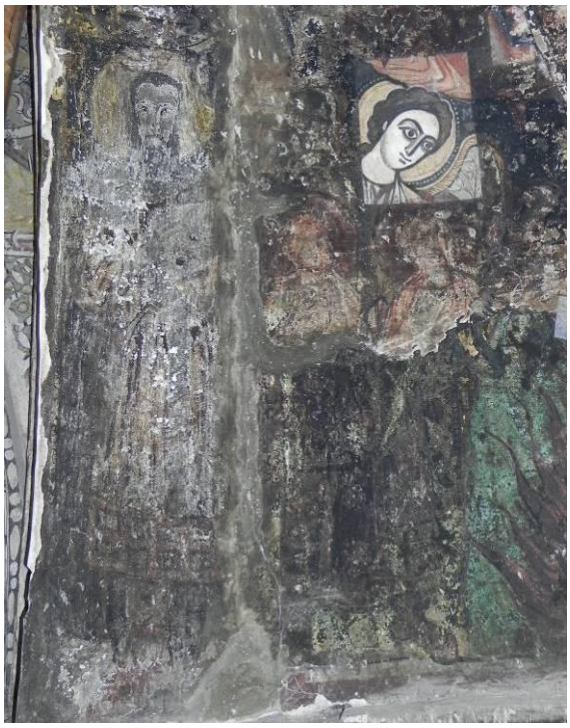
The plaster was consolidated by injecting it with a liquid mortar whose composition was similar to that of the original plaster.

In some cases, the edges of the plaster had to be consolidated by means of injections of 35% acrylic resin in an aqueous emulsion (ACRYL 33) into specific areas. Micro-pointing was carried out in the cracks and at the edges of the gaps in the plaster to prevent the injected liquid mortar from running out.

In urgent cases, small fragments of detached plaster were replaced using a mortar based on 35% acrylic resin in an aqueous emulsion (ACRYL 33) bulked out with micronized calcium carbonate until the desired consistency was reached.

Raised areas of the paint layer in imminent danger of falling were stuck down by means of injections of 15% acrylic resin in an aqueous emulsion (ACRYL 33). In some cases slight pressure with a flexible spatula was required, interposing a sheet of polyethylene between the spatula and the surface.

The methods of cleaning the painted surface have been described in detail in previous reports (Figures 43 and 44).




Figures 43 and 44

The cleaning system involves the use of organic solvents applied using Japanese paper covered with several thicknesses of single-ply paper tissue to dissolve the substances on the surface (oil- and resin-based varnish). The application of the Japanese paper and paper tissues impregnated with naturally evaporating solvents actually creates a "drawing up" effect that removes and partially solubilizes the substance without any mechanical action.

In brief, we proceeded as follows: removal of varnish (oil- and resin-based) alternately using the following organic solvents applied on single-ply paper tissues until evaporated (ACETONE, NITRO THINNER, NITRO THINNER with the addition of DIMETHYL SULFOXIDE dissolved in acetone at 50%). Each application of solvent was followed by the application of acetone in the same manner in order to encourage the evaporation of the solvent just used. In specific cases, where waxy substances were present, chlorinated solvents (TRIELINE) were used, heated to approximately 45˚ in a bain marie. These solvents were never used on areas painted using the encaustic technique.

The residue of oily substances applied to the surface and repainting work were removed with a pH controlled polar solution (70 g/l ammonium carbonate in distilled water). The solution was applied to the surface using several thicknesses of single-ply paper tissue with contact times varying between 3 and 5 minutes. We then went on to remove sooty deposits, oily residue and thin films of saline efflorescence using a slightly basic polar solution (10 drops of ammonia per liter of distilled water) applied on single ply paper tissues and working in small areas at a time. Thicker saline efflorescence was removed mechanically using a scalpel.

Continuous deposits of dirt (Figure 68) made up of particulate matter and carbon residues were removed by dabbing with a simple solution of ammonium carbonate (70 g/l in

distilled water). Sometimes a sheet of Japanese paper was placed between the pad and the surface and the pad rolled over it (Figures 45 and 46).


Figures 45 and 46

The black lines around figures and decorative elements traditionally added as a finishing touch to the painting process were particularly fragile in some instances (Figure 47). As a result, after preliminary cleaning, some of them had to be fixed with acrylic resin (15% PARALOID B72 in a nitro thinner) applied with a brush. Once the cleaning operation was completed, the fixing was removed with organic solvents applied through Japanese paper.

Figure 47

Owing to the thick layer of bird droppings and mud (insect nests) on the capital of the monumental column in the facade, a slightly different cleaning procedure was required. A basic solution of water with a small percentage of ammonia was applied using single-ply paper tissues for a contact time of approximately one minute. Having softened the surface in this manner, we removed several millimeters of the layer using mechanical means (scalpels and small chisels). This process had to be repeated several times, taking care to work only when the area previously treated was completely dry, thereby avoiding excessive diffusion of water into the limestone (Figure 48).


Figure 48

The granite and limestone stonework was cleaned by applying compresses made up of a medium (wood pulp) and a moisture retainer (TYLOSE) added to a solution of inorganic salts. This compress was easy to apply for different contact times, some of them quite long, without soaking the stone unduly (Figure 49).


Figure 49

Once the compress was removed, the granite and limestone were dabbed with sponges and soft-bristled brushes. The two innermost columns of the first tier of the east lobe required thorough removal of a particularly thick and embedded layer of grease and wax using chlorinated solvents (TRIELINE) before cleaning with inorganic salts.

Finally, areas where the paint layer was failing to adhere were consolidated with the application of a low percentage solution of acrylic resin (1.5% PARALOID B72), applied with a nebulizer and, where possible, a brush.

The granite stonework was given a surface treatment of ethyl silicate (ESTEL 1000) applied with a brush.

The gaps in the paint layer were blended in using the technique of toning down with watercolors (WINDSOR & NEWTON). This technique restores legibility to the artistic palimpsest and painted surface and clarifies the reading of the different paint layers (palimpsest) (Figure 50).

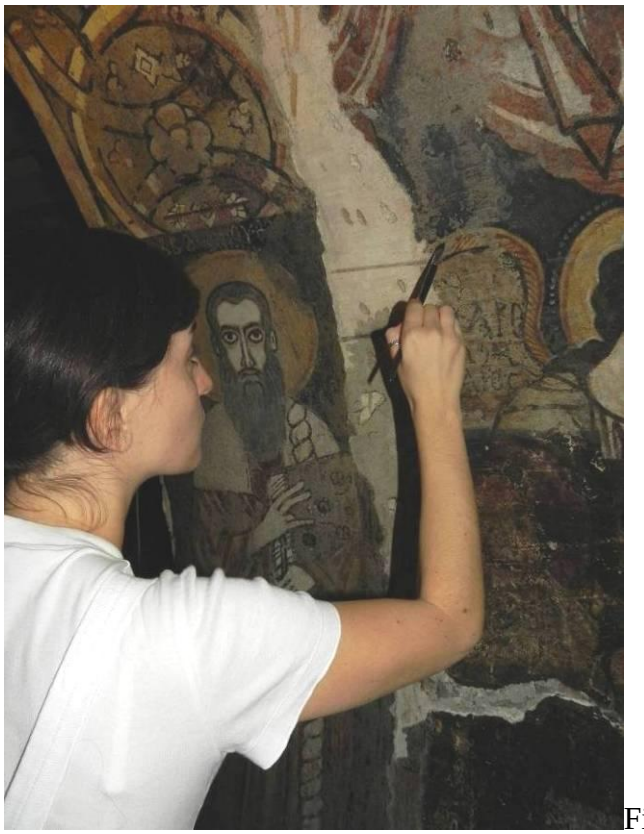


Figure 50

By common accord with the project management and in order to satisfy the desire expressed by the religious community, a gap in the center of the face of the *Virgo Lactans* (north corridor – NEB – west wall) was blended in using broken lines of water color on pointing (Figure 51).
During this mission we also worked on the niches in the north corridor (NEB), repairing the medieval plaster where it was patchy. The pointing was then esthetically treated by toning it down with water colors.

Figure 51

The same kind of repairs were effected on the niche containing the baptismal font (Pastophorium – SEC) With the support of Father Maximous El Anthony, a water drainage system was installed in the wall under the font. Previously the water drained straight into the masonry towards the outside of the building on the east side. The masonry was then repaired with red bricks.

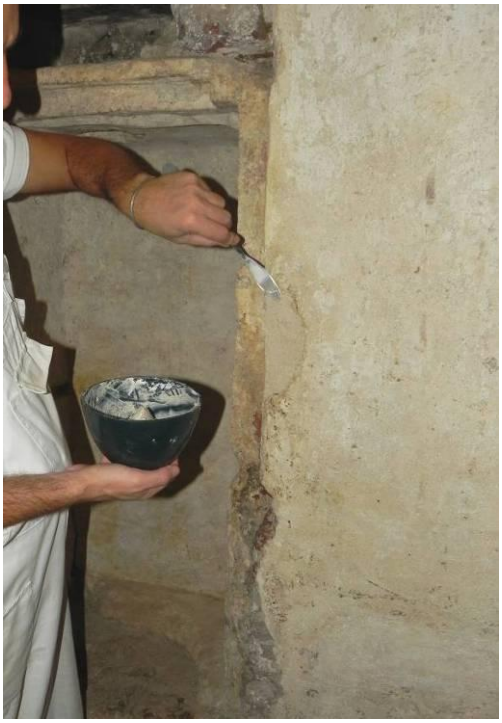


Figure 52

East apse – Temporary removal of fragments of plaster

With the agreement of the project management, it was agreed to remove two fragments of third-phase plaster in the east apse. These fragments were seriously detached and isolated by deep cracks from the surrounding areas of the painting. The operation, already partially studied and planned during the previous mission, was intended to improve the state of preservation of the plaster and the detachment of fragments inside the vault. It also enabled us to reveal pieces of second-phase plaster and study the working methods and original materials.
During the conservation process the painted surface of the fragments was consolidated with several applications of acrylic resin (PARALOID B72) in a 2% solution of nitro thinner. The surface was then protected by applying a sheet of Japanese paper followed by a piece of fine strong gauze stuck on with the same resin (20% in acetone), taking care to ensure that the resin did not exceed the edges of the piece to be removed.


Figure 53


Figure 54

A number of rigid supports made of fiberglass rods (Figure 56) and strips of plaster-impregnated orthopedic gauze (Figure 54) were then fixed to the surface to provide the fragments with a reliable support during and after removal.

Before removal of the fragments, several small cones (Figure 55) were attached to the fabric to act as anchorage points between the support and the fragment to be removed. These cones can also assist the separation and subsequent repositioning of the fragment on the support if necessary.

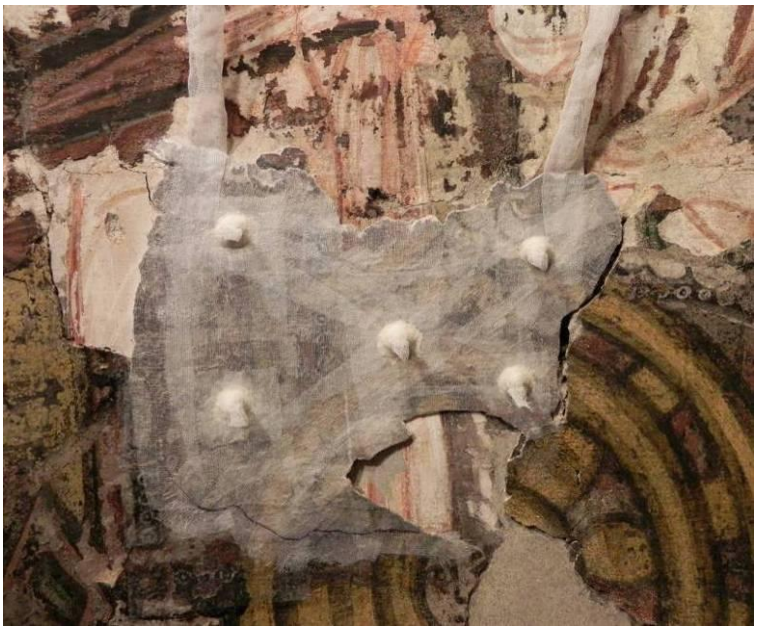


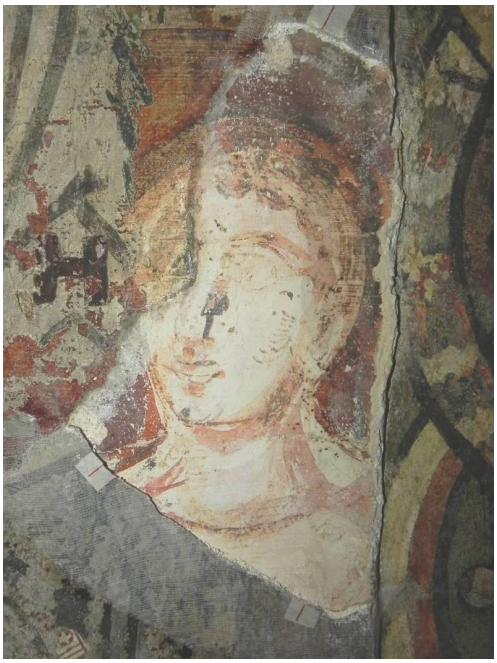
Figure 55

During removal, the plaster support was suspended from two strips of gauze attached to a wooden supporting frame (Figure 56).


Figure 56

Slight leverage produced by inserting small metal spatulas along the cracked perimeter was used to loosen the fragments which were already almost detached (Figure 57).


Figure 57

Figures 58 and 59